post_incompact3d

We collect here discretized versions of flow statistics and parameters implemented for post-processing for a temporal TBL in the program `post_incompact3d`. For integral quantities, use the python function `high_order_integrals.py` (same parent directory). It is possible to compile the program with `TTBL_MODE:OFF`, in order to perform the averages also in time (it can be used for example for channel flow simulations).

Statistics are averaged along x and z directions. Different flow realizations can also be considered. Average in time is performed only with `TTBL_MODE:OFF`.

Velocity field (O(6))

- Averages

$$\langle u \rangle, \langle v \rangle, \langle w \rangle$$

- Variances

$$\langle u'^2 \rangle, \langle v'^2 \rangle, \langle w'^2 \rangle$$

- Skewnesses

$$\mathsf{skew}[u], \mathsf{skew}[v], \mathsf{skew}[w]$$

- Kurtoses

$$\mathsf{kurt}[u], \mathsf{kurt}[v], \mathsf{kurt}[w]$$

Reynolds stresses (O(6))

$$\langle u'v' \rangle, \langle u'w' \rangle, \langle v'w' \rangle$$

Pressure field (O(6))

- Average and variance

$$\langle p \rangle, \langle p'^2 \rangle$$

Scalar field (O(6))

- Average and variance

$$\langle \varphi \rangle, \langle \varphi'^2 \rangle$$

Mixed fluctuations (O(6))

$$\langle u'\varphi' \rangle, \langle v'\varphi' \rangle, \langle w'\varphi' \rangle$$

Vorticity field (O(6))

- Averages

$$\langle \omega_x \rangle, \langle \omega_y \rangle, \langle \omega_z \rangle$$

Mean gradient (O(6))

$$\langle \frac{\partial u}{\partial y} \rangle = \frac{\partial U}{\partial y}$$